REMARKS

This amendment is submitted in Response to the outstanding Office Action dated May 27, 2009.

As for the supplemental oath or declaration, the specification has been changed so that this application is a continuation of the previous application No. 09/801 098. As such, the supplemental oath or declaration is not required.

The objection to Claim 10 in paragraph 4 of the Office Action has been considered. Claim 10 has been amended to delete the word, "substantially."

The objection to Claims 20, 23 and 26 in paragraph 5 of the Office Action has been considered. Claims 20, 23 and 26 have been amended so that the phrase, "a nematic liquid crystal," except the first one has been changed to "the nematic liquid crystal."

The objection to Claims 20, 22, 23 and 26 in paragraph 6 of the Office Action has been considered. Claims 20, 22, 23 and 26 have been amended so that the phrase, "image data," except the first one has been changed to "the image data."

The objection to Claims 20, 22, 23 and 26 in paragraph 7 of the Office Action has been considered. Claims 20, 22, 23 and 26 have been amended so that the word, "using," has been changed to "with."

The objection to Claims 22 and 23 in paragraph 8 of the Office Action has been considered. Claims 22 and 23 have been amended to delete the word, "predetermined."

The objection to Claim 26 in paragraph 9 of the Office Action has been considered. Claim 26 have been amended so that the phrase, "an initial level," except the first one has been changed to "the initial level."

The objection to Claim 27 in paragraph 10 of the Office Action has been considered. Claim 27 have been amended so that the phrase, "on image," has been changed to "an image."

The rejections of Claims 3, 4, 7, 10, 15, 20, 21, 23-32, 34 and 35 under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and

distinctly claim the subject matter which Applicants regard as the invention, have been considered. Claims 20, 23 and 26 have been amended so that the phrase, "the liquid crystal," has been changed to "the nematic liquid crystal." Also, Claims 4, 22 and 28 have been amended so that the phrase, "the liquid crystal," has been changed to "the nematic liquid crystal."

In addition, Claim 28 has been amended to depend upon Claim 27 rather than Claim 26. As such, the limitation, "the image," has sufficient antecedent basis.

Claims 15, 22-24, 33 and 34 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Koden, U.S. Patent. No. 5 323 172.

Claim 22 is directed to an image display method for a liquid crystal display device including a matrix liquid crystal panel with a nematic liquid crystal, consisting of the steps of:

applying a first absolute voltage corresponding to image data to the nematic liquid crystal during a first time period in a unit period; and

applying a second absolute voltage having a potential and that does not correspond to the image data to the nematic liquid crystal in a second time period different from the first time period in the unit period,

wherein the matrix liquid crystal panel is an active matrix liquid crystal panel. (emphasis added)

In contrast, Koden discloses in Figure 5 the voltage applied to liquid crystal. The voltage consists of a negative value, a positive value, and zero value. However, Koden does not apply the absolute voltage to the liquid crystal. In addition, Koden does not disclose that the voltage is corresponding to the image data. In column 2, lines 43-46, Koden merely discloses that when display at a certain pixel is not changed for a long period of time, a voltage of the same polarity is applied to the ferroelectric liquid crystal of

that pixel. Thus, Koden uses both negative and positive voltages rather than the absolute voltage.

In view of the above, Claim 22 is believed to be patentably distinguishable over Koden.

Claim 23 is directed to a method for driving a nematic liquid crystal in a liquid crystal display device that includes the nematic liquid crystal, two electrodes confining the nematic liquid crystal, a pair of polarizing plates sandwiching the electrodes and a matrix liquid crystal panel with the nematic liquid crystal, consisting of the steps of:

applying a first absolute voltage corresponding to image data to the nematic liquid crystal during a first time period in a unit period; and

applying a second absolute voltage not corresponding to the image data to the nematic liquid crystal during a second separate time period in the unit period,

wherein the unit period includes a separate first input of the first absolute voltage, a second input of the second absolute voltage and the optical transmittance of the nematic liquid crystal returns to or remains at an original level during the unit period and the matrix liquid crystal panel is an active matrix liquid crystal panel. (emphasis added)

As discussed above, Koden does not apply the absolute voltage to the liquid crystal, and does not teach that the voltage corresponds to the image data. Further, Koden does not disclose that the optical transmittance of the nematic liquid crystal returns to or remains at an original level during the unit period. In Figure 5, a change in the amount of transmitted light turns to the positive value from zero at 1/3 t_0, and remains at the positive value until the unit period. The change in amount of transmitted light returns to zero at 1/3 t_0 of next unit period.

In view of the above, Claim 23 is also believed to be patentably distinguishable over Koden.

Claims 15, 24, 33 and 34 depend upon what is believed to be allowable Claims 22 or 23, are believed allowable

therewith, and include additional features which further distinguish over Koden. For example, Claim 15 recites, "the unit period is less than or equal to eight milliseconds." Koden discloses that the pulse width necessary for the switching is 200 µsec, but does not teach that the unit period is less than or equal to eight milliseconds.

Claims 3, 4, 7, 10, 20, 21, 25-32 and 35 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Koden, U.S. Patent. No. 5 323 172 in view of Handschy et al., U.S. Patent No. 5 748 164.

Claim 20 is directed to a method for driving a nematic liquid crystal in a liquid crystal display device comprising the nematic liquid crystal, two electrodes sandwiching the nematic liquid crystal, two polarizing plates sandwiching the two electrodes and a matrix liquid crystal panel with the nematic liquid crystal, consisting of the steps of:

applying a first voltage corresponding to image data to the nematic liquid crystal during a first time period in a unit period; and

applying a second voltage that does not correspond to the image data to the nematic liquid crystal during a second time period in the unit period,

wherein the unit period consists of the first time period and the second time period, and the optical transmittance of the nematic liquid crystal changes from an initial level corresponding to the second voltage to a level corresponding to the image data during the first time period and changes from the level corresponding to the image data to the initial level corresponding to the second voltage during the second time period, and the matrix liquid crystal panel is an active matrix liquid crystal panel. (emphasis added)

The Examiner admits Koden does not disclose that optical transmittance of the nematic liquid crystal changes from the level corresponding to the image data to the initial level corresponding to the second voltage during the second time period, and cites Handschy to cure this deficiency.

Handschy shows in Figure 8 the ON/OFF state of the pixel in time period. Figure 8 also shows the brightness for each

subframe. As shown in Figure 8, the brightness increases in frame F1' and decreases in frame F2'. Thus, Handschy does not disclose that optical transmittance changes from an initial level corresponding to the second voltage to a level corresponding to the image data during the first time period and changes from the level corresponding to the image data to the initial level corresponding to the second voltage during the second time period. In addition, in Figure 8 of Handschy, the brightness changes depending on the subframes rather than on the time period. Moreover, the brightness level of Handschy does not correspond to the image data or to the voltage. The brightness level increases as the amount of light available for the subframe increases.

In view of the above, Claim 20 is believed to be patentably distinguishable over Koden and Handschy, alone or in combination with one another.

Claim 26 is directed to a method for driving a nematic liquid crystal in a liquid crystal display device comprising the nematic liquid crystal, two electrodes sandwiching the nematic liquid crystal, two polarizing plates sandwiching the two electrodes and a matrix liquid crystal panel with the nematic liquid crystal, consisting of the steps of:

applying a first absolute voltage corresponding to image data to the nematic liquid crystal during a first time period in a unit period; and

applying a second absolute voltage that does not correspond to the image data to the nematic liquid crystal during a second time period in the unit period,

wherein the unit period consists of the first time period and the second time period, and the optical transmittance of the nematic liquid crystal changes from an initial level corresponding to the second absolute voltage to a level corresponding to the image data during the first time period and changes from a level corresponding to the image data to the initial level corresponding to the second absolute voltage during the second time period, and

the first absolute voltage consists of a first positive voltage and a first negative voltage, the sum of the first positive voltage and the first negative voltage is zero volts in the unit period, and the matrix liquid crystal panel is an active matrix liquid crystal panel. (emphasis added)

As discussed above, both Koden and Handschy do not apply the absolute voltage to the liquid crystal, and do not teach that the voltage corresponds to the image data. Further, Koden and Handschy do not disclose that the optical transmittance of the nematic liquid crystal changes from an initial level corresponding to the second absolute voltage to a level corresponding to the image data during the first time period and changes from a level corresponding to the image data to the initial level corresponding to the second absolute voltage during the second time period.

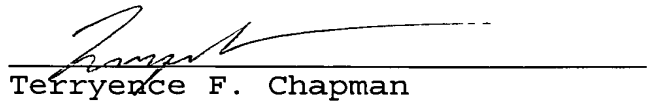
In view of the above, Claim 26 is also believed to be patentably distinguishable over Koden and Handschy, alone or in combination with one another.

Claims 3, 4, 7, 10, 21, 25, 27-32 and 35 depend upon what is believed to be allowable Claims 20 or 26, are believed allowable therewith, and include additional features which further distinguish over Koden or Handschy.

Claims 3 and 27 recite, "the second voltage applied in the second time period of the unit period erases an image on the panel during the second time period." Claims 4 and 28 recite, "erasure of the image displayed on the panel is effected by driving the nematic liquid crystal to display black on the panel." Claim 10 recites, "the voltage applied in the second time period of the unit period erases an image on the panel by darkening the TFT liquid crystal panel to black during the second time period." Koden and Handschy do not teach the erasure of the image.

In view of the above, the instant application is believed to be in condition for allowance, and action toward that end is respectfully requested.

Respectfully submitted,



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